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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

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This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Atty. Docket No.	CTSF 0156 PRV

INVENTOR(s)		
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____ Additional inventors are being named on the ___ separately numbered sheets attached hereto.

TITLE OF THE INVENTION *(500 characters max.)*

SPRING CLIP FOR USE IN A CONVERTIBLE TOP HAVING SIDE TENSION CABLES

DIRECT ALL CORRESPONDENCE TO:

CUSTOMER NO.

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ENCLOSED APPLICATION PARTS *(check all that apply)*

X	Specification - Number of Pages 7	____	CD(s). Number ____
X	Drawing(s) - Number of Sheets 2	____	Other: Specify ____
____	Application data sheet. See 37 CFR 1.76.		

METHOD OF PAYMENT OF FILING FEES *(check one)*

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Respectfully submitted.

SIGNATURE Kevin J. Heinl
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CERTIFICATION UNDER 37 C.F.R. § 1.10

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SPRING CLIP FOR USE IN A CONVERTIBLE TOP HAVING SIDE TENSION CABLES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to convertible tops having side tension cables that tension the convertible top.

2. Background Art

Convertible tops can include side tension cables to tension the top in its closed position. Such provides a smooth, snug fit between the top and various vehicle components that it covers, such as a windshield frame, side window frames, and other support frames. This smooth, snug fit is preferred because it provides an aesthetically pleasing appearance while also limiting gaps and leakage paths into a passenger area.

The tensioning cables are hidden under the top in a pocket or other enclosure and run along side support rails to fit the top against the rails. The tensioning member interconnects the cable to a one bow of the top. The one bow member is actuated by a top stack as it travels from its opened, or retracted, position in a storage compartment at the rear of the vehicle to its closed, or extended, position. As the top is extended, the cable is straightened so that the tensioning member pulls against the cable to flatten the cable against the top and provides the smooth, snug fit to the vehicle.

Prior to the present invention, tensioning members typically included a helical spring that required multiple connections to the one bow and the cable. A disadvantage of these multiple connecting point helical spring tensioning members is that they are difficult to assemble. Multiple steps in the manufacturing process are required to connect each end of the tensioning member. Additional parts must be fabricated and result in additional part counts.

For example, if the member is a helical spring having catches or loops at either end that latch into the front-support and cable, then multiple steps are required to secure the catches. This process can be time consuming and requires that an assembler take time to latch the catches. This may be difficult due to their relatively small size and the relatively high degree of precision required to connect them.

In addition, the tensioning member may require additional fasteners to secure the member to the one bow and cable. For example, a screw or other similar fastener is typically drilled into the top to connect or support the tensioning member. The cost of additional parts and additional manufacturing costs to attach it adds further cost to the convertible top.

As more and more vehicle manufacturers are becoming more cost conscious and are demanding less complex manufacturing processes, the inventors of the present invention have recognized a need to invent a member for tensioning the cable that reduces the complexity and cost of the prior art convertible tops.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a fragmentary perspective view of a convertible top in its extended position on a vehicle;

FIGURE 2 is a perspective view of a rod spring and cable assembly made according to one embodiment of the present invention;

FIGURE 3 is a fragmentary perspective view showing a rod spring and cable ready to be assembled to a one bow of the convertible top; and

FIGURE 4 is a fragmentary perspective view of a rod spring and cable assembled to the one bow of a convertible top.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

FIGURE 1 illustrates a partial top view of a vehicle 10 having a convertible top 12. The vehicle 10 corresponds to any vehicle that may include the convertible top 12. The convertible top 12 is used with a vehicle having a windshield 16, at least one side window 18 on each side, and one or more support pillars 20 that support the windshield 16 and windows18.

The convertible top 12 can be any type of convertible top that can be opened to expose a passenger area and closed to cover the passenger area, or other areas of the vehicle, such as a truck bed. The convertible top 12 can include non-rigid, semi-rigid, or rigid materials, such a canvas, cloth, plastic, metal, or an alloy or composite of the same.

Preferably, the top 12 includes a tension 28 cable on both sides of the vehicle 10 to provide a smooth, snug fit between the top 12 and the rails that it covers. This smooth, snug fit is generally preferable because it provides an aesthetically pleasing appearance while also limiting gaps and water leakage paths into a passenger area.

Preferably, the tensioning cable 28 is hidden under the top 12 in a pocket, or other enclosure, 30 and runs along side support rails from a leading to a trailing end of the top 12. The pocket 30 may be seen in the fragmentary cross-section shown in Figure 1.

In accordance with the present invention, a tensioning member 34 is provided to connect the cable 20 to a one bow 38 of the top 12. The tensioning member 34 provides a tensioning force that pulls on the cable 18 when the top 12 is closed. The pulling action tightens the cable 18 to flatten it out, and thereby, to flatten out the top 12 into a smooth, snug relationship with the support rails.

FIGURE 2 illustrates the tensioning member 34 of the present invention in more detail. This arrangement is generally referred to as a U-shaped rod spring clip 40. The rod spring clip 40 includes a clip portion 42 that includes an elbow 44, a longitudinal portion 46, and a U-shaped portion 48 which together provide tensioning force that is applied to the cable 28.

The tensioning member 34 is connected at one end to the cable 18 by a crimped cylindrical sleeve 54. The cylindrical sleeve 54 is an inexpensive connector that can quickly and securely connect to the rod spring clip 40 to the cable 18. Other connectors could similarly be used without deviating from the present invention.

Alternatively, the rod spring clip 40 could include a catch, loop, or other item that can be latched to, tied to, or otherwise fastened to the cable. Such devices may be slightly more labor intensive to attached, but would not deviate from the broad scope of the present invention. The installation of the tensioning member 34 of the present invention with such alternative arrangements would still be relatively less complex than the prior art devices.

The tensioning member 34 comprises a suitable resilient material, such as a plastic, metal, alloy, or other composition that allows it to maintain a predefined shape while at the same time being sufficiently resilient and capable of providing adequate tension. The configuration shown in Figure 2 is one example of a preferred configuration, but other configurations, shapes, and features also may be incorporated in the present invention.

The embodiment shown in Figure 2 provides a tensioning member 34 that improves upon the manufacturing complexity and reduces the cost in comparison to the prior art. In particular, the present invention provides a simplified solution which is easier to assemble and decreases manufacturing costs.

The installation may be performed by a robot or other automatic assembly tool. The tensioning member can be manually assembled or automatically

assembled because the installation is relatively simple and does not require intricate manipulations to install. However, manual assembly techniques could also be used to install the tensioning member 34 with relative ease.

As shown in Figures 3 and 4, the tensioning member 34 can be easily inserted into the one bow 38 and secured thereto. The present invention may eliminate screws or other fastening devices to attach the tensioning member 34 to the one bow 38.

The one bow 38 preferably includes molded positioning members into which the tensioning member 34 can be easily inserted. The positioning members support portions of the rod spring clip 40 allowing the clip 40 to tension the cable 28. The one bow 38 includes a relief cut out 60, a side wall 62, a pin 64, and a catch 68. Together, these elements cooperate with the tensioning member 34 to tension the cable 28. The one bow is molded in a Thixomolding® process wherein a magnesium alloy or other lightweight and durable material is injection molded in one step to net size and shape. The relief cut out 60, side wall 62, pin 64, and catch 68 may all be integrally formed in the Thixomolding® process.

Referring back to Figure 2, it can be seen that the U-shaped portion 48 ex tends below the longitudinal portion 46 to define its U-shape. The U-shape portion 48 is fitted between the front support side wall 62 and the pin 64 and extends partially around the cath 68. The U-shaped portion 46 deflects resiliently about the cath 68 to tension the cable 28.1lly therefrom to the catch 68. This allows the u-shaped portion 46 to tense against the side wall 62 and the catch 68 to thereby tension the cable 28.

A prong 72 is provided on the rod spring clip 40 and extends generally perpendicularly relative to the longitudinal portion 46 and extends through the front support member relief cut out 60. The prong 72 biases the tensioning member 34 against lifting out of its position between the side wall 62 and the pin 64. In addition, the catch 68 can include an inclined slope that can further limit disengagement of tensioning member 34.

The tensioning member 34 is assembled to the one bow 38 in a two-step process. The first step includes crimping the tensioning member 34 to the cable and the second step includes simultaneously positioning the U-shaped portion 48 between the side wall 62, pin 64, and positioning the prong 72 in the relief 60. The longitudinal portion 46 is positioned within the latch support 68.

Once positioned, the resiliency of the tensioning member 34 allows it to move from position D1 to position D2 over a distance D. To move from distance D1 to D2, some tensioning force must be supplied by the cable 28 to pull on the tensioning member 34. This force can be supplied to the cable 28 while the cable is moved from its folded position as the top 12 is being closed.

The cable 28 has a maximum length that is selected such that the cable 28 begins to tug on the tensioning member 34 just before the front-support member 38 closes. The rod spring clip 40 responds to the tugging of the cable 28 such that it pulls on the cable 28 to flatten it out and to provide the desired smooth, snug fit between the top 12 and the vehicle 10 once the top closes.

The tensioning force is provided by the rod spring clip 40 interacting with one bow 38. The present invention, however, is not limited to these particular configurations and arrangements.

Alternatively, additional parts or few parts and features could be included on the one bow 38 to support and tension the rod spring clip 40 as needed. Moreover, the tensioning member 34, or rod spring clip 40, could include other configurations and shapes such that it could be designed to comport with design and spacing limitations of the front support member 38. This design flexibility allows the invention to be adapted to other convertible top designs.

For example, the latch support 68 could be offset laterally from the side wall 62 and the pin 64 to change the tension on the cable 28 by changing the leveraging point of the longitudinal portion 46. Moreover, the U-shaped portion 48 can be eliminated in favor an L-shaped configuration whereby the prong 72 would

lie in the same plane as the longitudinal portion 46. T rod spring clip 40 could be provided without the U-shaped portion. This arrangement may eliminate the need for the pin 64.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.

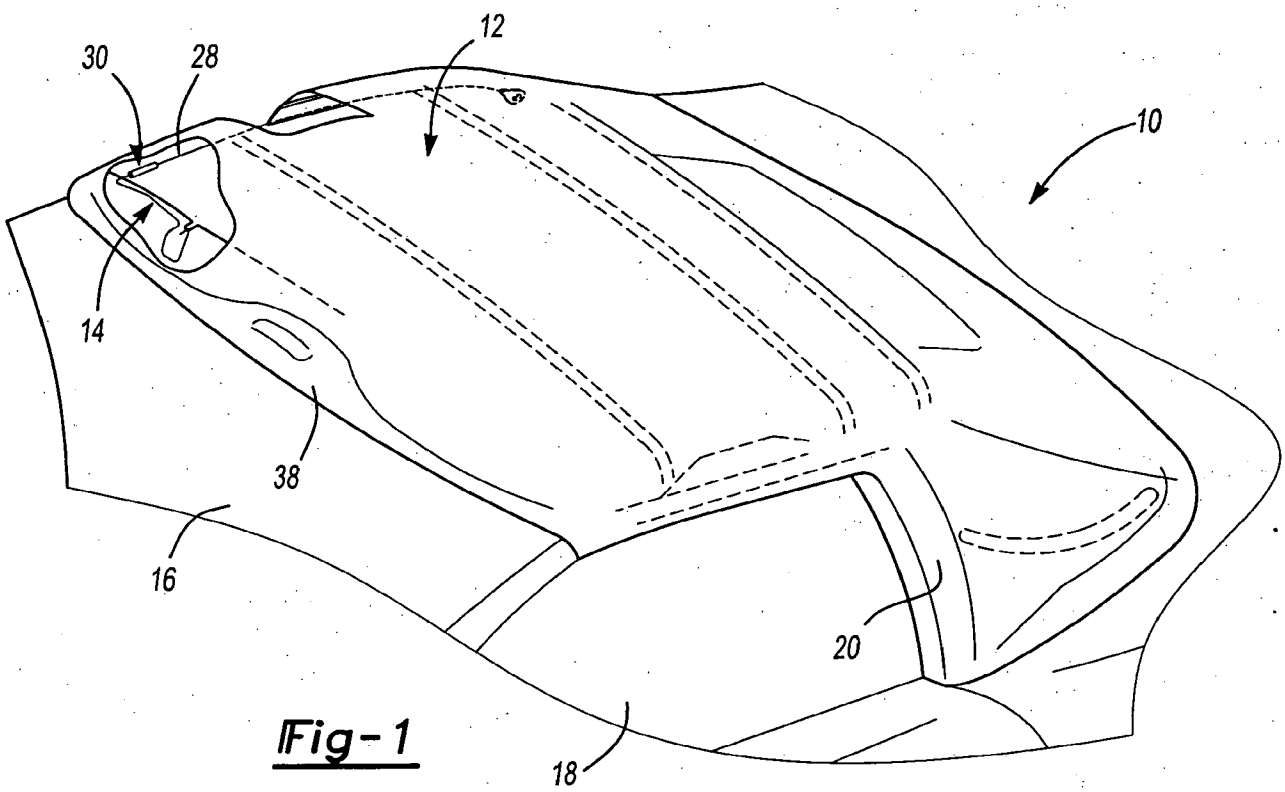

Fig-1

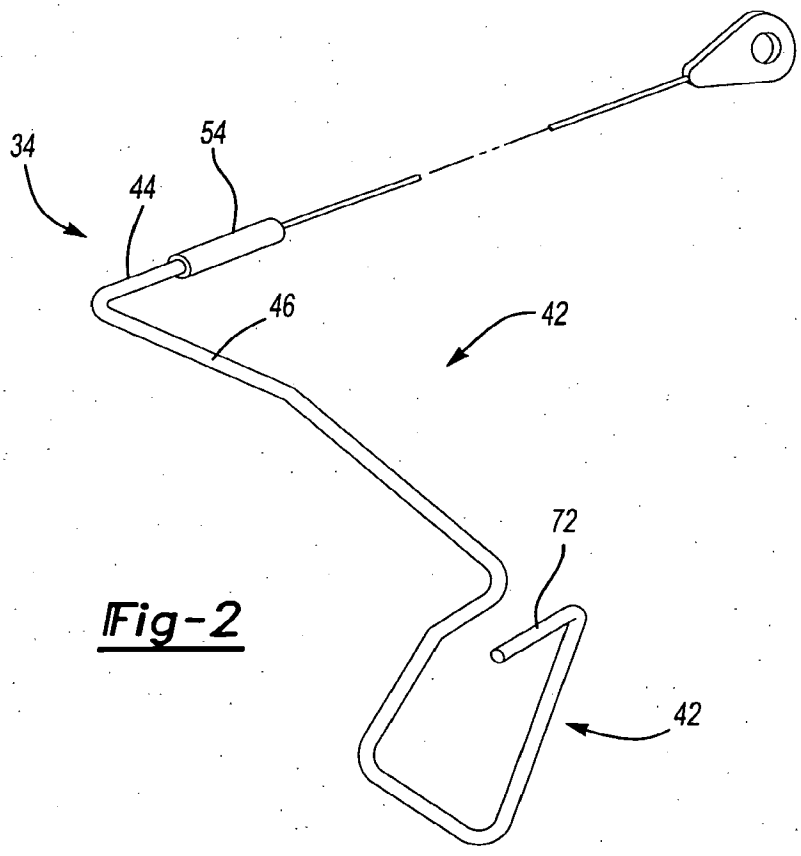

Fig-2

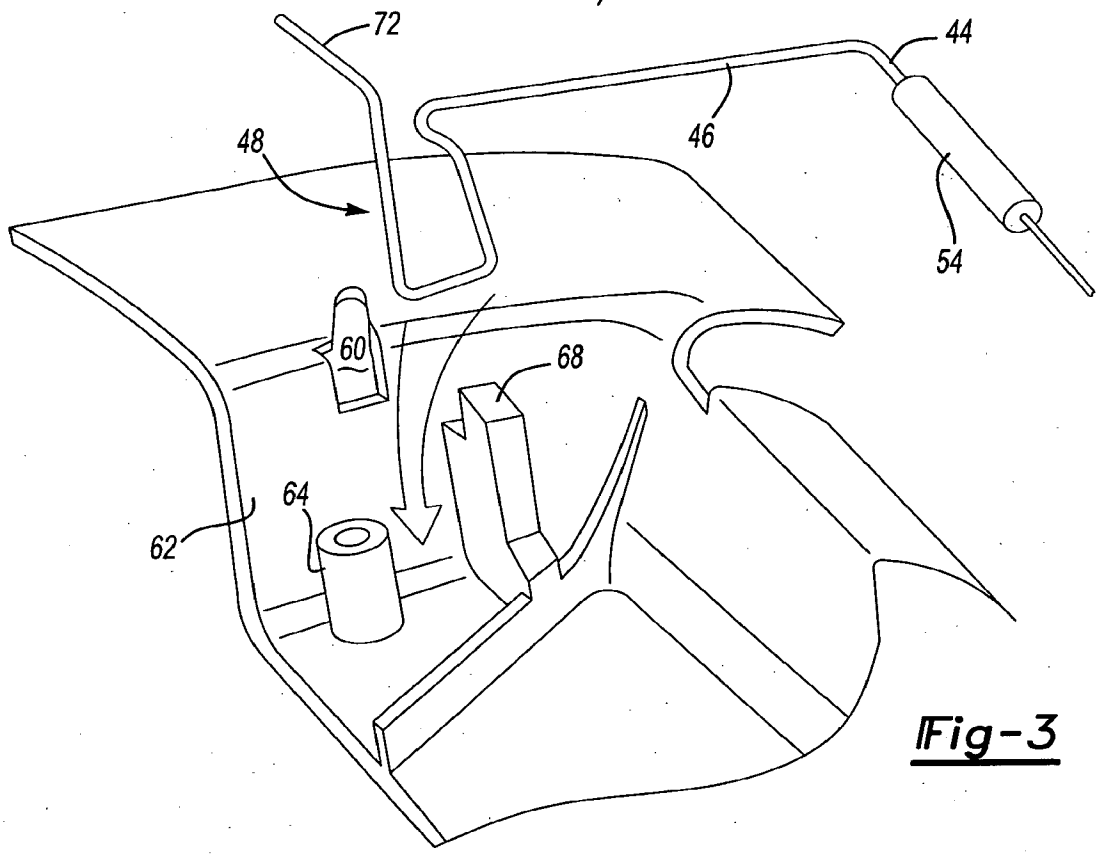

Fig-3

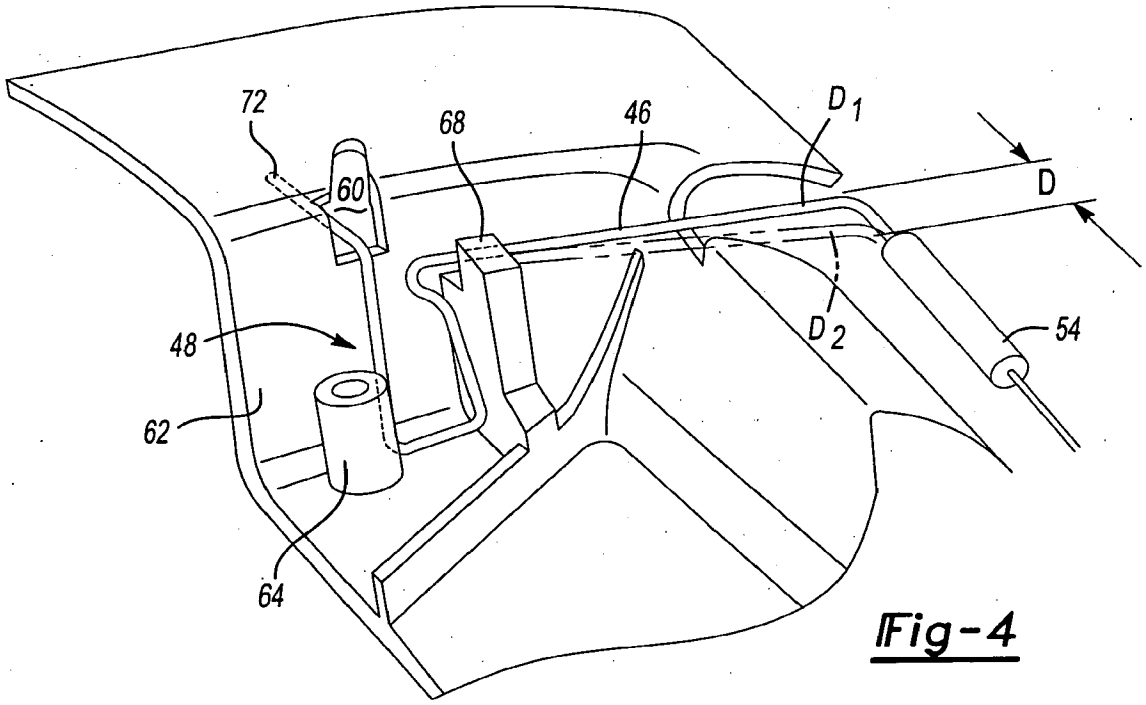

Fig-4